

AMENDMENTS TO THE CLAIMS

Claims 1-29 were originally pending.

Please amend claims 5, 8, 11, and 22.

No claims are canceled or added.

Accordingly, claims 1-29 remain pending.

The following listing of claims replaces all prior versions, and listings of claims in the application.

1. (Original) A method for providing thread scheduling in a device, the device comprising one or more hardware elements operatively coupled to an operating system comprising a plurality of program modules, the method comprising:

scheduling one or more threads according to a predetermined periodic rate;

determining whether or not there are any threads to execute; and responsive to a determination that there are no threads to execute, deactivating at least one subset of components for a dynamic variable amount of time, the one subset being selected from a group of components comprising the hardware elements and the program modules, the dynamic variable amount of time being independent of the predetermined periodic rate and being based on a sleep state of a set of threads in a sleep queue.

1 2. (Original) A method as recited in claim 1, wherein the
2 dynamic variable amount of time is based on a maximum amount of time
3 that a thread can yield before needing to be scheduled for execution.

4
5 3. (Original) A method as recited in claim 1, wherein the device
6 is a battery powered device.

7
8 4. (Original) A method as recited in claim 1, wherein the
9 operating system comprises an operating system selected from a group of
10 operating systems comprising Microsoft WINDOWS CE, Linux,
11 WindRiver, QNX, or PALM operating systems.

12
13 5. (Currently amended) A method as recited in claim 1, wherein
14 ~~the scheduling,~~ the predetermined periodic rate is a millisecond.

15
16 6. (Original) A method as recited in claim 1:
17 wherein the providing further comprises setting a system timer to
18 generate a notification at the predetermined periodic rate;

19 wherein the deactivating further comprises resetting the system timer
20 to generate the notification after the dynamic variable amount of time has
21 elapsed since the deactivating; and

22 wherein the method further comprises:
23 receiving the notification after the dynamic variable amount
24 of time has elapsed since the deactivating; and
25 responsive to the receiving:

1 resetting the system timer to generate the notification
2 at the predetermined periodic rate; and
3 activating the at least one subset of components.
4

5 7. (Original) One or more computer-readable media containing a
6 computer executable program that performs a method as recited in claim 1.
7

8 8. (Currently amended) A method for providing thread
9 scheduling in a device, the device comprising one or more hardware
10 elements operatively coupled to an operating system comprising a plurality
11 of program modules, the method comprising:

12 scheduling one or more threads at a predetermined periodic rate;
13 determining whether or not there are any threads to execute; ~~and~~
14 responsive to a determination that there are no threads to execute,
15 deactivating at least one subset of components for a dynamic variable
16 amount of time, the one subset being selected from a group of components
17 comprising the hardware elements and the program modules, the dynamic
18 variable amount of time being based on a sleep state of ~~the~~ a set of threads
19 in a sleep queue and independent of the predetermined periodic rate; and

20 activating the one subset of components only when the operating
21 system needs to perform an action selected from a group of actions
22 comprising scheduling a thread for execution upon expiration of the
23 dynamic variable amount of time since the deactivating, or upon receipt of
24 an external event, ~~processing the external event, wherein the external event~~
25 that is not a system timer event.

1
2 9. (Original) A method as recited in claim 8, wherein the device
3 comprises a battery powered device.
4

5 10. (Original) A method as recited in claim 8, wherein the
6 operating system comprises a Microsoft WINDOWS CE operating system.
7

8
9 11. (Currently amended) A method as recited in claim 8, wherein
10 ~~the scheduling,~~ the predetermined periodic rate is a millisecond.
11

12 12. (Original) A method as recited in claim 8:
13 wherein the scheduling further comprises setting a system timer to
14 the predetermined periodic rate, the predetermined periodic rate
15 corresponding to a thread scheduling accuracy; and

16 wherein the deactivating further comprises resetting the system timer
17 to generate a notification after the dynamic variable amount of time has
18 elapsed since the deactivating.
19

20 13. (Original) A method as recited in claim 8:
21 wherein the deactivating further comprises resetting a system timer
22 to generate a notification after the dynamic variable amount of time has
23 elapsed, the dynamic variable amount of time being a maximum amount of
24 time that a thread can yield to other threads before needing to be scheduled
25 for execution; and

1 wherein the activating further comprises resetting the system timer
2 to the predetermined periodic rate to provide substantial thread scheduling
3 accuracy.

4
5 14. (Original) One or more computer-readable media containing a
6 computer executable program that performs a method as recited in claim 8.

7
8 15. (Original) A computer-readable storage medium containing
9 computer-executable instructions for scheduling threads in a device, the
10 device including an operating system comprised of a plurality of program
11 modules that are in turn coupled to one or more hardware elements, the
12 computer-executable instructions comprising instructions for:

13 determining at a periodic rate whether or not there are any threads to
14 execute; and

15 responsive to a determination that there are no threads to execute,
16 deactivating at least one subset of components for a dynamic variable
17 amount of time, the at least one subset being selected from a group of
18 components comprising the one or more of the program modules and one or
19 more of the hardware elements, the dynamic variable amount of time being
20 independent of the periodic rate, the dynamic variable amount of time being
21 based on a sleep state of a set of threads in a sleep queue.

22
23 16. (Original) A computer-readable storage medium as recited in
24 claim 15, wherein the dynamic variable amount of time comprises a
25

1 maximum amount of time that a thread has specified that it will yield to
2 other threads before it needs to be scheduled for execution.

3
4 17. (Original) A computer-readable storage medium as recited in
5 claim 15, wherein the device comprises a battery powered device.

6
7 18. (Original) A computer-readable storage medium as recited in
8 claim 15, wherein the operating system comprises a Microsoft WINDOWS
9 CE operating system.

10
11 19. (Original) A computer-readable storage medium as recited in
12 claim 15, wherein the computer-executable instructions further comprise
13 instructions for:

14 in the deactivating, configuring a system timer to send a first timer
15 interrupt after the dynamic variable amount of time has elapsed, the
16 dynamic variable amount of time being a maximum amount of time that a
17 first thread can yield to a second thread before the first thread needs to be
18 executed; and

19 responsive to receiving the first timer interrupt:

20 (a) configuring the system timer to send a second timer interrupt at
21 the periodic rate; and

22 (b) activating the deactivated at least one subset of components to
23 determine if there are any threads to execute.

1 20. (Original) A computer-readable storage medium as recited in
2 claim 15, wherein the computer-executable instructions further comprise
3 instructions for:

4 receiving an external interrupt before the dynamic variable amount
5 of time has elapsed since the deactivating, the external interrupt not being a
6 system timer interrupt; and

7 responsive to receiving the external interrupt, processing the external
8 interrupt such that the at least one subset of components remain deactivated
9 for the dynamic variable amount of time.

10
11 21. (Original) A computer comprising one or more computer-
12 readable media as recited in claim 15.

13
14 22. (Currently amended) A device comprising:

15 a processor ~~configured to fetch and execute a plurality of computer-~~
16 ~~executable instructions;~~

17 a plurality of hardware elements coupled to the processor; ~~and,~~ and

18 a memory coupled to the processor, the memory comprising for
19 storing the computer-executable computer-program instructions executable
20 by the processor, the computer-program instructions comprising a
21 scheduler program module, a hardware abstraction layer (HAL) program
22 module, one or more operating system program modules, and a set of
23 application program modules;

24 wherein the scheduler comprises computer-executable instructions
25 for:

1 scheduling threads for execution at a periodic time interval;
2 and
3 determining that there are no threads to execute; and
4 wherein the HAL, responsive to the determining, comprises
5 computer-executable instructions for deactivating, for a dynamic variable
6 amount of time, at least one subset of components selected from a group of
7 components comprising the scheduler, the hardware elements, the one or
8 more operating system program modules, and the application program
9 modules, the dynamic variable amount of time being independent of the
10 periodic time interval and being based on a sleep state of a set of threads in
11 a sleep queue.

12
13 23. (Original) A device as recited in claim 22, wherein the
14 dynamic variable amount of time is based on a maximum amount of time
15 that a thread can yield before needing to be scheduled.

16
17 24. (Original) A device as recited in claim 22, wherein the
18 periodic time interval is a millisecond.

19
20 25. (Original) A device as recited in claim 22, wherein the device
21 comprises a battery powered device.

22
23 26. (Original) A device as recited in claim 22, wherein the
24 operating system is an operating system selected from a group of operating
25

1 systems comprising Microsoft WINDOWS CE, Linux, WindRiver, QNX,
2 or Palm ® operating systems.

3
4 27. (Original) A device as recited in claim 22, wherein the HAL
5 further comprises computer-executable instructions for re-activating the at
6 least one subset of components after the dynamic variable amount of time
7 has elapsed since the at least one subset of components were deactivated.

8
9 28. (Original) A device as recited in claim 27, wherein the
10 scheduler is re-activated in a manner that allows the scheduler to schedule
11 threads based on the periodic time interval.

12
13 29. (Original) A device as recited in claim 22, wherein after the
14 scheduler is deactivated, the HAL further comprises computer-executable
15 instructions for receiving a notification in response to an external event, the
16 external event not being a system timer event, responsive to receipt of the
17 notification, the HAL processing the notification in a manner that the
18 scheduler remains deactivated for the dynamic variable amount of time.